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HIGH-ORDER METHODS FOR SCALE-RESOLVING SIMULATIONS OF INDUSTRIALLY RELEVANT TURBULENT FLOWS 700 - NUMERICAL METHODS AND ALGORITHMS IN SCIENCE AND ENGINEERING

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ABSTRACT

In recent years, high-order discretizations have received increased attention from the Computational Fluid Dynamics community, as they have the potential to enable Scale-Resolving Simulation approaches (SRS), *e.g*, Large-Eddy Simulation (LES) and Direct Numerical Simulation, for industrial applications. Indeed, high-order methods can efficiently provide "academic" accuracy on "industrial meshes" taking full advantage of the most recent High Performance Computing (HPC) architectures, including accelerators. However, such numerical methods still pose significant challenges before reaching a full industrial deployment. On one hand, LES is by definition under-resolved, which challenges the robustness of high-order schemes. Pre- and post-processing technologies, including mesh generation, visualisation and standards for data storage, still show a lack of maturity with respect to their low-order counterparts.

This minisymposium aims to gather advances in high-order numerical methods towards practical applicability of SRS. Particular topics of interest include, but are not limited to:

- fundamental developments towards improved robustness, *e.g.*, capturing methods for turbulent flows and entropy-stable formulations;
- algorithms and implementation of high-order schemes in an HPC context;
- curvilinear mesh generation and high-order solution visualisation;
- applications of high-order SRS to practical flows, including the use for turbulence model improvement through dedicated DNS and LES.